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2292 7590 05/03/2010

BIRCH STEWART KOLASCH & BIRCH
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FALLS CHURCH, VA 22040-0747

EXAMINER	
ANSARI, TAHMINA N	
ART UNIT	PAPER NUMBER
2624	

DATE MAILED: 05/03/2010

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/586,997	07/21/2006	Ryousuke Fujii	1163-0574PUS1	8791

TITLE OF INVENTION: ELECTRONIC WATERMARK EMBEDDING METHOD, ELECTRONIC WATERMARK DETECTING METHOD, ELECTRONIC WATERMARK DETECTING APPARATUS AND PROGRAM

APPLN. TYPE	SMALL ENTITY	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	NO	$1510	$300	$0	$1810	08/03/2010

THE APPLICATION IDENTIFIED ABOVE HAS BEEN EXAMINED AND IS ALLOWED FOR ISSUANCE AS A PATENT. PROSECUTION ON THE MERITS IS CLOSED. THIS NOTICE OF ALLOWANCE IS NOT A GRANT OF PATENT RIGHTS. THIS APPLICATION IS SUBJECT TO WITHDRAWAL FROM ISSUE AT THE INITIATIVE OF THE OFFICE OR UPON PETITION BY THE APPLICANT. SEE 37 CFR 1.313 AND MPEP 1308.

THE ISSUE FEE AND PUBLICATION FEE (IF REQUIRED) MUST BE PAID WITHIN THREE MONTHS FROM THE MAILING DATE OF THIS NOTICE OR THIS APPLICATION SHALL BE REGARDED AS ABANDONED. THIS STATUTORY PERIOD CANNOT BE EXTENDED. SEE 35 U.S.C. 151. THE ISSUE FEE DUE INDICATED ABOVE DOES NOT REFLECT A CREDIT FOR ANY PREVIOUSLY PAID ISSUE FEE IN THIS APPLICATION. IF AN ISSUE FEE HAS PREVIOUSLY BEEN PAID IN THIS APPLICATION (AS SHOWN ABOVE), THE RETURN OF PART B OF THIS FORM WILL BE CONSIDERED A REQUEST TO REAPPLY THE PREVIOUSLY PAID ISSUE FEE TOWARD THE ISSUE FEE NOW DUE.

HOW TO REPLY TO THIS NOTICE:

I. Review the SMALL ENTITY status shown above.

If the SMALL ENTITY is shown as YES, verify your current SMALL ENTITY status:

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B. If the status above is to be removed, check box 5b on Part B - Fee(s) Transmittal and pay the PUBLICATION FEE (if required) and twice the amount of the ISSUE FEE shown above, or

If the SMALL ENTITY is shown as NO:

A. Pay TOTAL FEE(S) DUE shown above, or

B. If applicant claimed SMALL ENTITY status before, or is now claiming SMALL ENTITY status, check box 5a on Part B - Fee(s) Transmittal and pay the PUBLICATION FEE (if required) and 1/2 the ISSUE FEE shown above.

II. PART B - FEE(S) TRANSMITTAL, or its equivalent, must be completed and returned to the United States Patent and Trademark Office (USPTO) with your ISSUE FEE and PUBLICATION FEE (if required). If you are charging the fee(s) to your deposit account, section "4b" of Part B - Fee(s) Transmittal should be completed and an extra copy of the form should be submitted. If an equivalent of Part B is filed, a request to reapply a previously paid issue fee must be clearly made, and delays in processing may occur due to the difficulty in recognizing the paper as an equivalent of Part B.

III. All communications regarding this application must give the application number. Please direct all communications prior to issuance to Mail Stop ISSUE FEE unless advised to the contrary.

IMPORTANT REMINDER: Utility patents issuing on applications filed on or after Dec. 12, 1980 may require payment of maintenance fees. It is patentee's responsibility to ensure timely payment of maintenance fees when due.

PTOL-85 (Rev. 08/07) Approved for use through 08/31/2010.

PART B - FEE(S) TRANSMITTAL

Complete and send this form, together with applicable fee(s), to: Mail **Mail Stop ISSUE FEE**
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INSTRUCTIONS: This form should be used for transmitting the ISSUE FEE and PUBLICATION FEE (if required). Blocks 1 through 5 should be completed where appropriate. All further correspondence including the Patent, advance orders and notification of maintenance fees will be mailed to the current correspondence address as indicated unless corrected below or directed otherwise in Block 1, by (a) specifying a new correspondence address; and/or (b) indicating a separate "FEE ADDRESS" for maintenance fee notifications.

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2292 7590 05/03/2010

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I hereby certify that this Fee(s) Transmittal is being deposited with the United States Postal Service with sufficient postage for first class mail in an envelope addressed to the Mail Stop ISSUE FEE address above, or being facsimile transmitted to the USPTO (571) 273-2885, on the date indicated below.

(Depositor's name)
(Signature)
(Date)

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/586,997	07/21/2006	Ryousuke Fujii	1163-0574PUS1	8791

TITLE OF INVENTION: ELECTRONIC WATERMARK EMBEDDING METHOD, ELECTRONIC WATERMARK DETECTING METHOD, ELECTRONIC WATERMARK DETECTING APPARATUS AND PROGRAM

APPLN. TYPE	SMALL ENTITY	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	NO	$1510	$300	$0	$1810	08/03/2010

EXAMINER	ART UNIT	CLASS-SUBCLASS
ANSARI, TAHMINA N	2624	382-100000

1. Change of correspondence address or indication of "Fee Address" (37 CFR 1.363).

❑ Change of correspondence address (or Change of Correspondence Address form PTO/SB/122) attached.

❑ "Fee Address" indication (or "Fee Address" Indication form PTO/SB/47; Rev 03-02 or more recent) attached. **Use of a Customer Number is required.**

2. For printing on the patent front page, list

(1) the names of up to 3 registered patent attorneys or agents OR, alternatively, 1_____

(2) the name of a single firm (having as a member a registered attorney or agent) and the names of up to 2 registered patent attorneys or agents. If no name is listed, no name will be printed. 2_____ 3_____

3. ASSIGNEE NAME AND RESIDENCE DATA TO BE PRINTED ON THE PATENT (print or type)

PLEASE NOTE: Unless an assignee is identified below, no assignee data will appear on the patent. If an assignee is identified below, the document has been filed for recordation as set forth in 37 CFR 3.11. Completion of this form is NOT a substitute for filing an assignment.

(A) NAME OF ASSIGNEE (B) RESIDENCE: (CITY and STATE OR COUNTRY)

Please check the appropriate assignee category or categories (will not be printed on the patent) : ❑ Individual ❑ Corporation or other private group entity ❑ Government

4a. The following fee(s) are submitted:

❑ Issue Fee

❑ Publication Fee (No small entity discount permitted)

❑ Advance Order - # of Copies _____

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❑ A check is enclosed.

❑ Payment by credit card. Form PTO-2038 is attached.

❑ The Director is hereby authorized to charge the required fee(s), any deficiency, or credit any overpayment, to Deposit Account Number _____ (enclose an extra copy of this form).

5. **Change in Entity Status** (from status indicated above)

❑ a. Applicant claims SMALL ENTITY status. See 37 CFR 1.27.

❑ b. Applicant is no longer claiming SMALL ENTITY status. See 37 CFR 1.27(g)(2).

NOTE: The Issue Fee and Publication Fee (if required) will not be accepted from anyone other than the applicant; a registered attorney or agent; or the assignee or other party in interest as shown by the records of the United States Patent and Trademark Office.

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Typed or printed name _____ Registration No. _____

This collection of information is required by 37 CFR 1.311. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, Virginia 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, Virginia 22313-1450.

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ANSARI, TAHMINA N	
ART UNIT	PAPER NUMBER
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Determination of Patent Term Adjustment under 35 U.S.C. 154 (b)
(application filed on or after May 29, 2000)

The Patent Term Adjustment to date is 728 day(s). If the issue fee is paid on the date that is three months after the mailing date of this notice and the patent issues on the Tuesday before the date that is 28 weeks (six and a half months) after the mailing date of this notice, the Patent Term Adjustment will be 728 day(s).

If a Continued Prosecution Application (CPA) was filed in the above-identified application, the filing date that determines Patent Term Adjustment is the filing date of the most recent CPA.

Applicant will be able to obtain more detailed information by accessing the Patent Application Information Retrieval (PAIR) WEB site (http://pair.uspto.gov).

Any questions regarding the Patent Term Extension or Adjustment determination should be directed to the Office of Patent Legal Administration at (571)-272-7702. Questions relating to issue and publication fee payments should be directed to the Customer Service Center of the Office of Patent Publication at 1-(888)-786-0101 or (571)-272-4200.

PTOL-85 (Rev. 08/07) Approved for use through 08/31/2010.

Notice of Allowability	Application No.	Applicant(s)	
	10/586,997	FUJII ET AL.	
	Examiner	Art Unit	
	TAHMINA ANSARI	2624	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to *04/21/2010*.

2. ☒ The allowed claim(s) is/are *1-22*.

3. ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
   a) ☐ All b) ☐ Some* c) ☐ None of the:
      1. ☐ Certified copies of the priority documents have been received.
      2. ☐ Certified copies of the priority documents have been received in Application No. _____ .
      3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

   * Certified copies not received: _____.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.
THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.

4. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.

5. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
   (a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review (PTO-948) attached
      1) ☐ hereto or 2) ☐ to Paper No./Mail Date _____.
   (b) ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date _____.

   Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).

6. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

Attachment(s)

1. ☐ Notice of References Cited (PTO-892)
2. ☐ Notice of Draftperson's Patent Drawing Review (PTO-948)
3. ☐ Information Disclosure Statements (PTO/SB/08), Paper No./Mail Date _____
4. ☐ Examiner's Comment Regarding Requirement for Deposit of Biological Material
5. ☐ Notice of Informal Patent Application
6. ☐ Interview Summary (PTO-413), Paper No./Mail Date _____ .
7. ☒ Examiner's Amendment/Comment
8. ☒ Examiner's Statement of Reasons for Allowance
9. ☐ Other _____.

EXAMINER'S AMENDMENT

1. An examiner's amendment to the record appears below. Should the changes and/or additions be unacceptable to applicant, an amendment may be filed as provided by 37 CFR 1.312. To ensure consideration of such an amendment, it MUST be submitted no later than the payment of the issue fee.

Authorization for this examiner's amendment was given in a telephone interview with Ali Imam, Registration No. 58,755 on April 26, 2010 and on April 27, 2010.

2. Amendments have been made to claims 7, 14, and 17-20. The application has been amended as follows:

Claim 7: An electronic watermark detecting method of detecting an embedded bit set of an electronic watermark to be detected from an electronic image into which the electronic watermark is embedded by using a method of dividing said electronic image into which the electronic watermark is to be embedded into a plurality of image regions spatially, producing a variation between pixel values in one of said plurality of image regions and those in an adjacent one of said plurality of image regions, and varying the pixel values of ~~***said***~~ adaptive pixels of said plurality of image regions in a time direction according to a value of the embedded bit set, wherein said electronic watermark detecting method comprises: a Gap detection step of detecting, as a Gap value, a pixel value difference corresponding to a pixel value variation in the time direction which is caused by the embedding of the electronic watermark for each of said plurality of image regions of said electronic image from which the electronic watermark is to be detected;

a correlation detection step of detecting a correlation value showing a correlation between a pattern of the pixel value variation in the time direction which is produced between the pixel values in the one of said plurality of image regions and those in the adjacent one of said plurality of image regions, which is caused by the electronic watermark to be embedded in said electronic image from which the electronic watermark is to be detected, and a pattern of the pixel value variation in the time direction of the one of said plurality of image regions of said electronic image from which the electronic watermark is to be detected; and an embedded bit judgment step of judging said embedded bit set from results of the detection of said Gap value and the detection of said correlation value for each of said plurality of image regions, and judging results of the judgment' complementarily so as to determine the embedded bit set finally.

Claim 14: An electronic watermark detecting apparatus for detecting an embedded bit set of an electronic watermark to be detected from an electronic image into which the electronic watermark is embedded by using a method of dividing said electronic image into which the electronic watermark is to be embedded into a plurality of image regions spatially, producing a variation between pixel values in one of said plurality of image regions and those in an adjacent one of said plurality of image regions, and varying the pixel values of ~~***said***~~ adaptive pixels of said plurality of image regions in a time direction according to a value of the embedded bit set, wherein said electronic watermark detecting apparatus comprises: a Gap detecting unit for detecting,

as a Gap value, a pixel value difference corresponding to a pixel value variation in the time direction which is caused by the electronic watermark embedding for each of said plurality of image regions of said electronic image from which the electronic watermark is to be detected; a correlation detecting unit for detecting a correlation value showing a correlation between a pattern of the pixel value variation in the time direction which is produced between the pixel values in the one of said plurality of image regions and those in the adjacent one of said plurality of image regions, which is caused by the electronic watermark to be embedded in said electronic image from which the electronic watermark is to be detected, and a pattern of the pixel value variation in the time direction of the one of said plurality of image regions of said electronic image from which the electronic watermark is to be detected; and an embedded bit determining unit for determining said embedded bit set from results of the detection of said Gap value and the detection of said correlation value for each of said plurality of image regions, and for judging results of the determination complementarily so as to determine the embedded bit set finally.

Claim 17: A ***non-transitory*** computer readable medium having stored thereon computer executable program, the computer program when executed causes a computer to function as an electronic watermark embedding apparatus comprising: a dividing processing unit for dividing an electronic image into which an electronic watermark is to be embedded into a plurality of image regions spatially; an adaptive extraction unit for extracting, as adaptive pixels, pixels each having a property of being

difficult to visually recognize a variation in a pixel value from each of said plurality of image regions; a watermark information generating unit for generating electronic watermark information which produces a variation between the pixel values of said adaptive pixels in one of said plurality of image regions and those of said adaptive pixels in an adjacent one of said plurality of image regions, and which varies the pixel values of said adaptive pixels of said plurality of image regions in a time direction, according to a value of an embedded bit set of an electronic watermark; and an embedding processing unit for varying the pixel values of said electronic image on the basis of said electronic watermark information, and for generating an electronic-watermark-embedded image by making the variation in the pixel values of said adaptive pixels vary step by step at a boundary between the two of said plurality of image regions and in the time direction so that the variation makes a slow transition.

Claim 18: A ***non-transitory*** computer readable medium having stored thereon computer executable program, the computer program a computer to function as an electronic watermark detecting apparatus for detecting an embedded bit set of an electronic watermark to be detected from an electronic image into which the electronic watermark is embedded by using a method of dividing said electronic image into which the electronic watermark is to be embedded into a plurality of image regions spatially, producing a variation between pixel values in one of said plurality of image regions and those in an adjacent one of said plurality of image regions, and varying the pixel values of ~~***said***~~ adaptive pixels of said plurality of image regions in a time direction according to

a value of the embedded bit set, wherein said program causes said computer to function as a Gap detecting unit for detecting, as a Gap value, a pixel value difference corresponding to a pixel value variation in the time direction which is caused by the electronic watermark embedding for each of said plurality of image regions of said electronic image from which the electronic watermark is to be detected; a correlation detecting unit for detecting a correlation value showing a correlation between a pattern of the pixel value variation in the time direction which is produced between the pixel values in the one of said plurality of image regions and those in the adjacent one of said plurality of image regions, which is caused by the electronic watermark to be embedded in said electronic image from which the electronic watermark is to be detected, and a pattern of the pixel value variation in the time direction of the one of said plurality of image regions of said electronic image from which the electronic watermark is to be detected; and an embedded bit determining unit for determining said embedded bit set from results of the detection of said Gap value and the detection of said correlation value for each of said plurality of image regions, and for judging results of the determination complementarily so as to determine the embedded bit set finally.

Claim 19: The ***non-transitory*** computer readable medium according to Claim 18, wherein the Gap detecting unit calculates, as the Gap value, a difference between averages of pixel values of two image data located in a vicinity of noted image data in the time direction, the two image data being included in plural image data in the time

direction which constitute the electronic image from which the electronic watermark is to be detected.

Claim 20: The ***non-transitory*** computer readable medium according to Claim 18, wherein the correlation detecting unit sequentially calculates, as reference images, averages of pixel values of image data located in a vicinity of noted image data in the time direction, the image data being included in plural image data in the time direction which constitute the electronic image from which the electronic watermark is to be detected, and also calculates a correlation value showing a correlation between a pattern of variations in the pixel values of these reference image and a pattern of variations in pixel values of the electronic watermark to be embedded into the electronic image from which the electronic watermark is to be detected.

Claims 7, 14 and 18 were amended to overcome any indefinite issues under 35 U.S.C. 112, regarding insufficient antecedent basis for the phrase "~~***said***~~ adaptive pixels".

Claims 17-20 were additionally amended to include the phrase "***non-transitory*** computer readable medium". These amendments are necessary to make the claimed subject matter of Claims 17-20 to be drawn to statutory subject matter, and to overcome any issues with respect to the broadest reasonable interpretation of computer-readable medium, which would typically cover forms of non-transitory tangible media as well as transitory propagating signals per se, making the recited claim language directed

towards non-statutory subject matter such as a "signal". Without these amendments, the claim as properly read in light of the disclosure appears to encompass non-statutory subject matter (i.e., because the specification is silent to the exact embodiment of a computer readable medium, it is interpreted as including the ordinary and customary meaning of computer readable medium covering both non-transitory media and transitory propagating signals, etc.).

> *"A transitory, propagating signal … is not a "process, machine, manufacture, or composition of matter." Those four categories define the explicit scope and reach of subject matter patentable under 35 U.S.C. § 101; thus, such a signal cannot be patentable subject matter." (In re Nuijten, 84 USPQ2d 1495 (Fed. Cir. 2007)).*

The examiner amendment to include the limitation "non-transitory" excludes any non-statutory subject matter, and ensures that the claimed subject matter of claims 17-20 are directed towards statutory subject matter, in view of the Official Gazette Notice (1251 OG 212, made available February 23, 2010). Any amendment to the claim should be commensurate with its corresponding disclosure.

REASONS FOR ALLOWANCE

3. Claims 1-22 are allowed.

4. The following is an examiner's statement of reasons for allowance:

   a. The prior art fails to teach the method of Claim 1, which specifically comprises the following features in combination with other recited limitations:

- a; An electronic watermark embedding method comprising:

- b; a dividing processing step of dividing an electronic image into which an electronic watermark is to be embedded into a plurality of image regions spatially;

- c; ***an adaptive extraction step of extracting, as adaptive pixels, pixels each having a property of being difficult to visually recognize a variation in a pixel value from each of said plurality of image regions***;

- d; and an ***embedding step of producing a variation between the pixel values of said adaptive pixels in one of said plurality of image regions and those of said adaptive pixels in an adjacent one of said plurality of image regions***,

- e; and ***varying the pixel values of said adaptive pixels of said plurality of image regions in a time direction, according to a value of an embedded bit set of an electronic watermark***,

- f; and of ***generating an electronic-watermark-embedded image by making the variation in the pixel values of said adaptive pixels vary step by step at a boundary between the two of said plurality of image regions***

-g; ***and in the time direction so that the variation makes a slow transition***.

As these limitations were in claim 1, and claims 2-6, 21-22 are dependent upon claim 1, and encompass the limitations specified in claim 1, thereby making them allowable subject matter as well.

b. The prior art fails to teach the method of Claim 7, which specifically comprises the following features in combination with other recited limitations:

- a; An electronic watermark detecting method of detecting an embedded bit set of an electronic watermark to be detected from an electronic image into which the electronic watermark is embedded,
- b; ***producing a variation between pixel values in one of said plurality of image regions and those in an adjacent one of said plurality of image regions, and varying the pixel values of said adaptive pixels of said plurality of image regions in a time direction according to a value of the embedded bit set wherein said electronic watermark detecting method comprises***:
- c; a ***Gap detection step of detecting, as a Gap value, a pixel value difference corresponding to a pixel value variation in the time direction which is caused by the embedding of the electronic watermark for each of said plurality of image regions of said electronic image from which the electronic watermark is to be detected***;

-d; ***a correlation detection step of detecting a correlation value showing a correlation between a pattern of the pixel value variation in the time direction which is produced between the pixel values in the one of said plurality of image regions and those in the adjacent one of said plurality of image regions, which is caused by the electronic watermark to be embedded in said electronic image from which the electronic watermark is to be detected, and a pattern of the pixel value variation in the time direction <u>of the one of said plurality of image regions</u> of said electronic image from which the electronic watermark is to be detected***;

-e; ***and an embedded bit judgment step of judging said embedded bit set from results of the detection of said Gap value and the detection of said correlation value for each of said plurality of image regions, and judging results of the judgment complementarily so as to determine the embedded bit set finally***.

As these limitations were in claim 7, and claims 8-12 are dependent upon claim 7, and encompass the limitations specified in claim 7, thereby making them allowable subject matter as well.

c. The prior art fails to teach the method of Claim 13, which specifically comprises the following features in combination with other recited limitations:

- a; An electronic watermark embedding apparatus comprising:

- b; a dividing processing unit for dividing an electronic image into which an electronic watermark is to be embedded into a plurality of image regions spatially;

- c; an ***adaptive extraction unit for extracting, as adaptive pixels, pixels each having a property of being difficult to visually recognize a variation in a pixel value from each of said plurality of image regions***;

- d; ***a watermark information generating unit for generating electronic watermark information which produces a variation between the pixel values of said adaptive pixels in one of said plurality of image regions and those of said adaptive pixels in an adjacent one of said plurality of image regions, and which varies the pixel values of said adaptive pixels of said plurality of image regions in a time direction, according to a value of an embedded bit set of an electronic watermark***;

- e; ***and an embedding processing unit for varying the pixel values of said electronic image on the basis of said electronic watermark information and for generating an electronic -watermark-embedded image by making the variation in the pixel values of said adaptive pixels vary step by step at a boundary between the two of said plurality of image regions***

-f; ***and in the time direction so that the variation makes a slow transition***.

d. The prior art fails to teach the method of Claim 14, which specifically comprises the following features in combination with other recited limitations:

- a; An electronic watermark detecting apparatus for detecting an embedded bit set of an electronic watermark to be detected from an electronic image into which the electronic watermark is embedded,
- b; by using a method of ***dividing said electronic image into which the electronic watermark is to be embedded into a plurality of image regions spatially, producing a variation between pixel values in one of said plurality of image regions and those in an adjacent one of said plurality of image regions, and varying the pixel values of said adaptive pixels of said plurality of image regions in a time direction according to a value of the embedded bit set,*** wherein said electronic watermark detecting apparatus comprises:
- c; ***a Gap detection unit for detecting, as a Gap value, a pixel value difference corresponding to a pixel value variation in the time direction which is caused by the embedding of the electronic watermark for each of said plurality of image regions of said electronic image from which the electronic watermark is to be detected***;

-d; ***a correlation detection unit for detecting a correlation value showing a correlation between a pattern of the pixel value variation in the time direction which is produced between the pixel values in the one of said plurality of image regions and those in the adjacent one of said plurality of image regions, which is caused by the electronic watermark to be embedded in said electronic image from which the electronic watermark is to be detected, and a pattern of the pixel value variation in the time direction <u>of the one of said plurality of image regions</u> of said electronic image from which the electronic watermark is to be detected***;

-e; ***and an embedded bit judgment step of judging said embedded bit set from results of the detection of said Gap value and the detection of said correlation value for each of said plurality of image regions, and judging results of the judgment complementarily so as to determine the embedded bit set finally***.

As these limitations were in claim 14, and claims 15-16 are dependent upon claim 14, and encompass the limitations specified in claim 14, thereby making them allowable subject matter as well.

e. The prior art fails to teach the method of Claim 17, which specifically comprises the following features in combination with other recited limitations:

- a; A computer readable medium having stored thereon computer executable program, the computer program when executed which causes a computer to function as an electronic watermark embedding apparatus comprising:

- b; a dividing processing unit for dividing an electronic image into which an electronic watermark is to be embedded into a plurality of image regions spatially;

- c; **an adaptive extraction unit for extracting, as adaptive pixels, pixels each having a property of being difficult to visually recognize a variation in a pixel value from each of said plurality of image regions**;

- d; **a watermark information generating unit for generating electronic watermark information which produces a variation between the pixel values of said adaptive pixels in one of said plurality of image regions and those of said adaptive pixels in an adjacent one of said plurality of image regions**,

- e; **and which varies the pixel values of said adaptive pixels of said plurality of image regions in a time direction, according to a value of an embedded bit set of an electronic watermark,**

- f; **and an embedding processing unit for varying the pixel values of said electronic image on the basis of said electronic watermark information, and for generating an electronic -watermark-embedded**

image by making the variation in the pixel values of said adaptive pixels vary step by step at a boundary between the two of said plurality of image regions

-g; **and in the time direction so that the variation makes a slow transition**.

f. The prior art fails to teach the method of Claim 18, which specifically comprises the following features in combination with other recited limitations:

- a; A program which causes a computer to function as an electronic watermark detecting apparatus for detecting an embedded bit set of an electronic watermark to be detected from an electronic image into which the electronic watermark is embedded:

- b; ***producing a variation between pixel values in one of said plurality of image regions and those in an adjacent one of said plurality of image regions, and varying the pixel values of said adaptive pixels of said plurality of image regions***

- c; ***wherein said program causes said computer to function as a Gap detecting unit for detecting, as a Gap value, a pixel value difference corresponding to a pixel value variation in the time direction which is caused by the electronic watermark embedding for each of said plurality of image regions of said electronic image from which the electronic watermark is to be detected***;

- d; ***a correlation detecting unit for detecting a correlation value showing a correlation between a pattern of the pixel value variation in the time direction which is produced between the pixel values in the one of said plurality of image regions and those in the adjacent one of said plurality of image regions, which is caused by the electronic watermark to be embedded in said electronic image from which the electronic watermark is to be detected, and a pattern of the pixel value variation in the time direction of said electronic image from which the electronic watermark is to be detected***;

-e; ***and an embedded bit determining unit for determining said embedded bit set from results of the detection of said Gap value and the detection of said correlation value for each of said plurality of image regions, and for judging results of the determination complementarily so as to determine the embedded bit set finally***.

As these limitations were in claim 18, and claims 19-20 are dependent upon claim 18, and encompass the limitations specified in claim 18, thereby making them allowable subject matter as well.

Some closely related prior art references are listed previously: Noridomi et al. (US PGPub US 2003/0210784 A1, hereby referred to as "Noridomi"), Oostveen et al. (WIPO Publication WO 03/055222 A2, hereby referred to as "Oostveen"), and the references cited in form PTO-1449. None of the references teach the *methods* recited

in claims 1 and 7; the *apparatuses* recited in claim 13 and 14; and the non-transitory computer readable mediums of claims 17 and 18. Especially, Noridomi is the most relevant reference. Noridomi teaches an electronic watermark embedding apparatus wherein an electronic watermark is embedded by dividing an image into a plurality of regions and determines a characteristic amounts in each image regions and an embedment intensity for each region with respect to a time axis **(Noridomi [0101]-[0113], [0123]-[0126], [0150], Figures 5-6, Figures 7-8)**. Noridomi's "characteristic amount" is "a value calculated on the basis of pixel values in an image at a certain area thereof" and "shows characteristics of the image at the certain area thereof" **(Noridomi: [0051])**, and teaches an area-dividing unit that spatially divides the image into local regions However, Noridomi does not specifically teach the term "adaptive pixels" comprising of "pixels each having a property of being difficult to visually recognize a variation in a pixel value from each of the plurality of image regions", nor does he teach "vary step by step at a boundary between the two of said plurality of image regions and in the time direction", a limitation in independent claims 1, 13, and 17. In addition, Noridomi does not specifically teach a watermark-detecting method or system, nor does he teach the limitation "produces a variation between the pixel values of said adaptive pixels in one of said plurality of image regions and those of said adaptive pixels in an adjacent one of said plurality of image regions", as specified in independent claims 7, 14, and 18. Oostveen is another relevant reference and teaches a watermark detecting method **(Oostveen, page 3 lines 5-7, page 5 lines 8-16, Figure 2 and 3)**, but also fails to teach the limitation "produces a variation between the pixel values of

said adaptive pixels in one of said plurality of image regions and those of said adaptive pixels in an adjacent one of said plurality of image regions", and does not teach "detecting a correlation value showing a correlation between a pattern of the pixel value variation in the time direction which is produced between the pixel values in the one of said plurality of image regions and those in the adjacent one of said plurality of image regions, which is caused by the electronic watermark to be embedded in said electronic image from which the electronic watermark is to be detected, and a pattern of the pixel value variation in the time direction of the one of said plurality of image regions of said electronic image from which the electronic watermark is to be detected". Therefore, none of the prior art references teach the claimed limitations of independent claims 1, 7, 13-14 and 17-18 alone or in combination, and consequently fail to teach the claimed subject matter of any depending claims as well.

5. Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to TAHMINA ANSARI whose telephone number is

(571)270-3379. The examiner can normally be reached on Monday through Thursday, 8:00 AM to 5:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, BHAVESH MEHTA can be reached on 571-272-7453. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Andrew W Johns/
Primary Examiner, Art Unit 2624

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/TA/

April 27, 2010